

Amendments to the Specification:

Please replace the paragraph beginning on line 28 of page 12 with the following amended paragraph:

B1
When the controller 120 instructs the agent to either set or obtain information from the mapping table 200, the system optimally allows the controller 120 to specify multiple, contiguous map table entries 210 in a single command. This allows the agent 110 and the controller 120 to interact more efficiently, with fewer instructions. However, when the controller 120 commands the agent 110 to set either all of the table entries 210 or one of the states for the table entry 210, the controller 120 command to the agent 110 optimally includes a "blocking" flag or state [[280]].

Please replace the paragraph beginning on line 7 of page 13 with the following amended paragraph:

B2
During an I/O operation, the presence of the blocking flag [[280]] in the controller 120 prompts the agent 110 to change the table 200 immediately. The agent 110, however, should not respond to the controller 120 until after the completion of any prior I/O operations initiated before the controller 120 command. In the preferred embodiment, the blocking flag 280 is included in the controller 120 command and applies only to the command containing the blocking flag [[280]]. Alternatively, although not shown in Figure 2, the blocking state [[280]] may be stored with each entry in the table 200 similar to the other states described above.

Please replace the paragraph beginning on line 17 of page 14 with the following amended paragraph:

B3
The activation of the Nw state 250 for any and all of the table entries 210 is generally accomplished in the system 100 according to the following description of a virtual disk or snapshot disk creation [[copy]] 300 operation, e.g., creation of a new

B³
snapshot disk that generally involves copying the contents of a previously created mapping table but not moving data to allow the new snapshot disk to share the same storage as the original disk, which is space efficient and fast. The disk copy 300 operation begins at step 305. In step 310, the controller 120 activates the Nw state 250 for all mapping table entries 210 in the persistent copy of the mapping table 200 for the original disk. The controller uses a set_entry_state command to communicate this change to all of the mapping agents 110 that map to this virtual disk 150 by setting the Nw state 250 for all mapping table entries 210 in these mapping agents 110, step 320. After this point, all attempts to write to the virtual disk 150 in the table 200 generate mapping faults to the controller 120. Alternatively, if the Nw state is not set, step 315, the controller 120 may activate the invalid flag 240 for all the mapping agent 110 map entries, step 325. The use of invalid flag 240 instead of the Nw flag 250 generates mapping faults for read operations that are otherwise allowed during when the Nw state 250 is activated. The key concept is that, at a minimum, all write attempts through the table 200 generate faults.

Please replace the paragraph beginning on line 5 of page 15 with the following amended paragraph:

B⁴
As described above, the controller 120 set_entry_state signals to the mapping agents 110 to activate the blocking flag [[280]]. As a result, the mapping agent 110 allows all prior I/O operation to complete prior to responding to the [[the]] controller 120 and implementing the changes to the Nw state 250. In this way, the [[the]] controller 120 can know when all outstanding writes to the original disk are completed. The controller 120 then copies the entire contents of the mapping table 200 for the original disk to a new mapping table 200 for the snapshot disk, step 330. This step 330 includes copying the active Nw state 250 for the table entries 210, so that later attempts to write to the snapshot disk containing the copy also generate mapping faults to the controller 120.

Please replace the paragraph beginning at line 15 of page 15 with the following amended paragraph:

At this point, the snapshot disk has been created and all write operations to the original disk or the snapshot disk will cause the mapping agent 110 to generate mapping faults to the controller 120, as described above. If the controller 120 determines that the quiesce function is active, step 340, the controller 120 issues the activate command to each mapping agent 110 mapping each virtual disk 150. Note, the quiesce command and the activate command are explained in detail after the description of Figures 5A and 5B, but briefly, the quiesce and activate commands allow the controller 120 to temporarily establish a barrier to queue I/O operations and to restart or activate such I/O operations when a system 100 includes multiple virtual disks 150 to enable data synchronization. The disk copy operation 300 concludes in step 350.

Please replace the paragraph beginning at line 1 of page 18 with the following amended paragraph:

In step 560, the control 120 sends set_entry commands to all mapping agents 110 that use the updated mapping table. This action propagates the segment change and the Nw state change to these mapping agents 110. The set_entry activates the blocking flag [[280]], allowing the controller 120 to know when all outstanding read I/Os to this segment have finished before allowing any writes to proceed to the original segment. The controller 120 waits for these set_entry operations to complete before acting further.
